



## **CAPE TOWN ENGINEERING EDUCATION & CAPACITY BUILDING DECLARATION**

**WHEREAS**, the International Federation of Engineering Education Societies (IFEES) and the Global Engineering Deans Council (GEDC) partnering with the African Engineering Education Association (AEEA) to organised the World Engineering Education Forum (WEEF) and supported by Federation of African Engineering Organisations (FAEO), World Federation of Engineering Organisations (WFEO) and United Nations Educational, Scientific and Cultural Organization (UNESCO), held in **Cape Town, South Africa** from the 28<sup>th</sup> of November to the 1<sup>st</sup> of December, 2022, under the theme: **“Adapting to Global Disruption”**,

**WHEREAS**, the African Engineering Week and Conference, hosted by the FAEO and Ethiopian Association of Civil Engineers (EACE), partnering with WFEO & UNESCO held in **Addis Ababa, Ethiopia** from the 8<sup>th</sup> to 22<sup>nd</sup> November 2022, under the theme **“Accelerating Sustainable Infrastructure Development in Africa Together”**,

**WHEREAS**, the WFEO-CECB Capacity Building in Engineering Education International Forum, Africa Asia Pacific Accord, and Zimbabwe Institution of Engineering (ZIE) Biennial Conference held in **Victoria Falls, Zimbabwe** from the 15<sup>th</sup> to the 19<sup>th</sup> of August, 2022, under the theme: **“Engineering the Future through Capacity Building, Partnerships, Innovative Infrastructure and Quality Engineering Education,”**

**NOTING THAT**, these conferences discussed diverse and cross-cutting topics, that informed policies, strategies and harmonized implementation frameworks for Africa and the rest of the World; delegates and partners at the WEEF, GEDC & AEEA Conference resolved to draft and adopt this CAPE TOWN ENGINEERING DECLARATION after,

**REALISING THAT**, with inadequate data of engineering capabilities, quality and quantity of human capital needs, that are required to achieve the Sustainable Development Goals (SDGs), African Union (AU) Agenda 2063 and other developmental aspirations, economic development will be hindered and unsustainable in developing countries especially Africa,

**OBSERVING THAT;**

- Engineering for the Sustainable Development Goals (SDGs) sees a world where engineers contribute to ensuring that all people have access to the services and resources necessary to live healthy, fulfilling lives in dignity and at peace, while working to preserve the global environment. Meeting the SDGs by 2030 and any development goals beyond that date will be impossible without the mobilization and full inputs of engineering professionals at all levels.
- Establishing and strengthening linkages and partnerships for research and training in the Africa and the rest of the World requires collaboration between our governments, professional engineering institutions, engineering education organisations and higher education institutions.

- The Creation of the **Africa, Asia, and the Pacific (AAP) Accord** by the Federation of African Engineering Organisations (FAEO) and the Federation of Engineering Institutions (FEIAP) in the Asia and Pacific was a landmark occasion as it ensured the professional engineering organisations in these regions will build up their ability to meet or exceed the requirements of the International Engineering Alliance (IEA) by group mentoring, training, benchmarking, and capacity building. The AAP Accord is the framework for the establishment of an International Standard of Engineering Education that empowers each member jurisdiction or economy of FEIAP and FAEO to establish a section of the Register for Engineering for Graduate Engineers, Engineering Technologist and Engineering technicians.
- The need for **Engineering Education and Capacity Building Transformation** to meet development aspirations and goals requires a united, coordinated, and harmonized approach, hence the call for the formation of an Engineering Education Forum with objectives to align, lead and report collectively.
- The need to develop humanitarian and engineering for good practitioners is imperative if we are to achieve our societal goals, peace, justice, climate change mitigation, adaptation, and disaster risk management.
- To create a sustainable space for Engineering Education Researchers and advocate for capacity development and retention of Engineering Education professionals.

**THEREFORE, the delegates DECLARED as follows:**

### **1. Institutional Capacity Building for Quality Engineering Services Delivery and Professional Engineering Practice**

- 1.1. There is need for financing and capacity building in engineering education and commit to further development of capacity to increase the number and quality of engineers, technologists, and technicians, who meet international standards.
- 1.2. While the world has become a “Global village”, there is need to impart skills transfer by companies to local engineers. Companies should identify understudy personnel and be involved in skills transfer during execution of their projects.
- 1.3. All our engineering organisations should adopt and implement **financing and capacity building programmes** to meet the requirements of International Accords benchmarks that enhance mobility of engineering professionals as guided by the International Engineering Alliance (IEA) and the World Federation of Engineering Organisations (WFEO) and professional competences (GAPC) as reviewed by IEA, UNESCO and WFEO in all engineering curricula development and review.
- 1.4. To work on **mutual recognition of credentials**, ease cross border movements and to provide integral opportunities to African engineering practitioners.
- 1.5. We need a new mindset for all existing disciplines and new ones that may be created to address the SDGs. We call for all disciplines to work together by creating synergetic initiatives and structures.

- 1.6. We call on international bodies to provide opportunities for engineers, engineering students, and engineering educators to act toward the SDGs, to do “Engineering for Good”. Policy changes need to be made to facilitate international cooperation and development and funding to support these actions.
- 1.7. We need to have a more inclusive curriculum that incorporates concepts from engineering, social sciences, humanities, policy and law, finance, medicine, and public health to advance “Engineering for Good”.
- 1.8. We call on engineering educators to develop students in interpersonal and intercultural competencies in order to also understand the impact of privilege and systemic oppressive structures influencing various practices in “Engineering for Good”.

## **2. Synergies and partnerships:**

- 2.1. All our engineering organisations should strengthen regional and international synergies by engaging in smart partnerships with society, governments, international organisations, industry, and academia to contribute towards sustainable solutions to the challenges that we face.
- 2.2. There is a need for engineering institutions to develop a cohesive vision framework, policies and strategies that address industry–academia partnership barriers.
- 2.3. Harmonizing engineering education and accreditation in Africa requires the creation and operationalisation of the **Africa Engineering Education Forum (AEEF)** that should take the lead as a response to mitigate shortage and quality of skills, streamlining and enhancing curriculum across higher learning institutions, work on accreditation requirements and policy, engineering education research, instructional practices, continuing professional development and education–industry partnerships to deal with disruptions, climate change and development gaps.
- 2.4. There is a need to lobby for inclusivity of local engineers in procurement services for huge infrastructure projects.

## **3. Development of Engineering Data sets and Open Science Repositories to improve Access to information**

- 3.1. To prevent reinventing the wheel, there is need to develop a data base of engineers’ skills and associated information in an online portal and compendium. This will ensure that we adopt electronic documentation that will create a Compendium to increase access to data on all engineering work.
- 3.2. To optimise processes in infrastructure development, there is need to develop digital integrated plans that are stored at a pivotal point and available to engineers through the digital platform.
- 3.3. Adopt open Science projects and Continuous Professional Development (CPD). This could be done through MOOCs in Education resources in partnership with UNESCO and others.

#### **4. Innovative Infrastructure, Sustainability, Diversity, and Inclusivity**

- 4.1. Our engineering organisations should lobby for inclusivity and diversity in policies, projects, employment, and decision making so that no one is left behind.
- 4.2. Alignment with global trends and the fourth industrial revolution IR 4.0 (big data, internet of things, augmented reality, and other modern disruptive technologies) is particularly important and should be taken on the development agenda, as well as the urgent need to develop basic infrastructures through African capacity and creative solutions.
- 4.3. Issues of sustainability of infrastructure would be enhanced by strategic import substitution. We need to identify components that can be locally manufactured and lobby for local manufacturing through the procurement system(s).

#### **5. Adoption of the Recommendations of the 2<sup>nd</sup> UNESCO Engineering Report (Africa Chapter), Needs and Numbers Study by SADC and the Education Digital Transformation Process;**

- 5.1. The meeting recommended that the 2<sup>nd</sup> UNESCO Engineering Report (Africa Chapter), Number and Needs Study findings and other research findings be implemented as endorsed by the SADC Ministers of Science and Technology. This should be done in support of the SADC Industrialisation strategy.
- 5.2. The implementation should be through the creation of cross-cutting committees composed of the SADC Secretariat, UNESCO ROSA, WFEO CECB, SAFEQ, GEDC, AEEF, AEEA, FAEO and its member institutions and Policy Makers from members states.
- 5.3. In the new landscape of the **Digital Revolution** now emerging, Education in general and Engineering Education needs to transform into digital and other modern delivery systems that address the new and the next normal;
- 5.4. The meeting further considered a framework of action to implement the recommendations to:
  - 5.4.1. **Increase Research Capacity in Engineering Education and develop engineering educators** to inform and guide practice;
  - 5.4.2. **Synergize and rationalise** the number of higher education institutions offering engineering;
  - 5.4.3. Align and **accredit** engineering qualifications considering international standards;
  - 5.4.4. Institutionalise **graduate training**;
  - 5.4.5. Align **registration processes** considering international standards;
  - 5.4.6. **Re-populate** public sector structures with experienced engineering capacity;
  - 5.4.7. **Invest** in infrastructure, operations, and maintenance to support the growth of manufacturing and mining;
  - 5.4.8. **Invest** in data collection and system developments; and
  - 5.4.9. **Engage** with the profession to create *Engineering Advisory Teams*.

Dated this 1st of December 2022 in Cape Town, South Africa and signed and approved by the representatives of the Conference Hosts and Partners below:

**(i) For the Global Engineering Deans Council (GEDC) and World Engineering Education Forum**



**Prof. Sunil Maharaj**: - The GEDC Chair & WEEF Conference Chair.

**(ii) For the UNESCO ROSA**



**Prof. Lidia Brito**: - The Director of UNESCO ROSA;

**(iii) For International Federation of Engineering Education Societies (IFEES) and GEDC**



**Prof. Hans J. Hoyer**: - Secretary General of IFEES & Executive Secretary of the GEDC.

**(iv) For the Africa Engineering Education Association (AEEA).**



**Prof. Funso Falade**: - The President: AEEA

**(v) For World Federation Engineering Organisations – Committee on Engineering Capacity Building (WFEO-CECB).**



**Engr. Martin Manuhwa**: -Chair WFEO Engineering Capacity Building Technical Standing Committee and Chair of the UNESCO Africa Engineering Week and Conference;

**(vi) For the Federation of African Engineering Organisations (FAEO): Engineering Education STC**



**Engr. Yashin Brijmohan**: -The Chair: FAEO Engineering Education Standing Technical Committee and Board Member of the International Centre for Engineering Education under the auspices of UNESCO.